

develop draft ECE acts, which should detail the provisions of the protocol and create a full legal framework for regulating electronic commerce within the EAEU¹.

Thus, the development of electronic commerce and the improvement of customs control mechanisms in the EAEU is an interrelated process that requires a comprehensive approach by all stakeholders: public authorities, businesses and consumers. Provided that the planned activities and strategies are implemented, the EAEU has every chance to create an effective and modern system of customs control of electronic commerce, corresponding to the best world practices and promoting the economic development of the EAEU members.

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DIGITAL TRANSFORMATION OF RISK MANAGEMENT IN CUSTOMS THROUGH THE INTRODUCTION OF ARTIFICIAL INTELLIGENCE

Research field:

Innovative technologies in international trade and customs.

The current stage in the development of international trade is characterized by a rapid increase in trade turnover, the complexity of logistics chains and an increase in the amount of data processed by customs authorities. In these circumstances, traditional risk management methods demonstrate their limited effectiveness.

The relevance of this research is due to the need for a scientific understanding of the transformation processes in customs control under the influence of digital technologies, as well as the need to develop practical mechanisms for implementing AI in the activities of customs services.

The relevance of the study is confirmed by several factors. First, the globalization of the world economy and the growth of cross-border commodity flows significantly increase the burden on customs authorities, requiring more effective control methods. Secondly, traditional approaches to risk management based on random inspections and expert assessments do not always cope with the challenges of our time - such as illegal turnover of goods, smuggling, customs evasion, etc. Third, the digital transformation of public administration creates prerequisites for the

¹ Цифровизация и логистика. Глава ГТК о новшествах в таможенной сфере в год председательства Беларуси в ЕАЭС [Электронный ресурс] / Государственный таможенный комитет. – Режим доступа : <https://www.gtk.gov.by/news/tsifrovizatsiya-i-logistika-glava-gtk-o-novshestvakh-v-tamozhennoy-sfere-v-god-predsdatelstva-belar/?ysclid=m9j1hslhms702970256>. – Дата доступа : 18.04.2025

introduction of intelligent data analysis systems that can identify risks that are inaccessible to human perception. At the same time, the experience of advanced countries (Singapore, South Korea, and the United Arab Emirates) in this matter demonstrates the high efficiency of using AI in customs, which requires scientific analysis and adaptation of best practices.

The purpose of this study is to develop scientifically based approaches to the use of artificial intelligence in the risk management system of customs authorities. To achieve this goal, the following tasks are solved: evaluating the effectiveness of existing risk control systems, analyzing modern AI technologies and their applicability in customs, identifying problem areas and restrictions, and developing recommendations for integrating AI solutions into customs practice.

The scientific novelty of the work lies in an integrated approach to studying the capabilities of AI for solving not only technical, but also organizational and managerial tasks of customs authorities in the context of digital transformation.

In the system of customs administration, the concept of risk is interpreted as the probability of occurrence of an unfavorable event that can lead to economic losses and a threat to the economic security of the state¹. Risks in customs activities are complex and can be classified on several grounds. According to the scope of occurrence, external risks are identified due to factors of international trade and global economic processes, and internal ones-related to the functioning of the customs system of Ukraine itself. According to the nature of the consequences, financial risks (non-receipt of customs payments), operational risks (errors in the classification of goods, system failures) and reputational risks (loss of trust in customs authorities) are distinguished². A special category is strategic risks associated with the illegal turnover of goods, smuggling and other types of illegal activities.

The traditional risk management system is based on 3 key elements: identification of risks, their assessment and development of minimization measures. The main methods are sample control, expert assessments, and statistical analysis of data from previous periods. A classic tool is a system of risk profiles - a pre-defined set of characteristics that allows you to assign a product or a foreign economic activity participant to a certain risk category. However, these methods have significant limitations. Selective control, being resource-intensive, does not provide full coverage and often leads to excessive checks of bona fide foreign trade participants. Expert assessments are

¹ On the functioning of the risk management system [Electronic resource] <https://customs.gov.by/participants-ved/tamozhennoe-deklarirovanie-vypusk-i-tamozhennyi-kontrol/o-funktsionirovanii-sistemy-upravleniya-riskami/> (access date: 10.04.2025)

² Risk management system as a mechanism for increasing the effectiveness of customs control in the Republic of Belarus [Electronic resource]: https://libeldoc.bsuir.by/bitstream/123456789/32853/1/Kniga_Avtomatizirovannaya.pdf (access date: 10.04.2025)

subject to subjectivity and do not always take into account dynamically changing patterns of violations. The system of risk profiles, being rigidly formalized, does not have time to adapt quickly to changing customs evasion schemes. A separate problem remains the fragmented nature of data and the lack of comprehensive analytical tools that allow us to identify complex relationships between various parameters of foreign trade operations.

The theoretical justification for the use of AI in the customs sphere is based on 3 key arguments. First, the exponential growth of international trade. According to the WTO, the world trade turnover increased from \$ 6.5 trillion in 2000 to \$ 32 trillion in 2024¹. This makes traditional monitoring methods physically incapable of providing effective monitoring without technological reinforcement. Secondly, the complexity of customs offense schemes requires a transition from reactive to predictive methods of risk management, which is possible only when using machine algorithms that can detect complex non-linear data dependencies. Third, the principles of "single window" and "smart borders" adopted under the Kyoto Convention presuppose intelligent automation of customs processes as a prerequisite for modern customs infrastructure.

International experience demonstrates evidence of the effectiveness of AI in the customs sector. Singapore Customs, recognized as a leader in digital transformation, has implemented TradeNetan AI-based TradeNet system that has reduced data processing time by 87%, while the accuracy of product classification has reached 98.7%. China's Smart Customs system Smart Customs integrates computer vision for cargo inspection, natural language processing for document analysis, and blockchain for tracking supply chains². Natural language processing allows you to automate the analysis of customs declarations and related documents by studying key parameters, and algorithms help to identify contradictions in the information provided³. AI-based computer vision technologies, in addition to analyzing X-ray images, are used to automatically recognize license plates, verify and authenticate labeling, and identify goods based on visual characteristics. The European experience (in particular, the EU's Customs Risk Management System project) also shows effective examples of applying AI-based technical solutions.

As the practice of leading customs administrations shows, successful implementation of AI technologies requires three main conditions: the availability of high-quality data, an appropriate regulatory framework, and trained personnel. However, direct copying of foreign solutions for the

¹ Annual Reports of the World Trade Organization [Electronic resource]:

https://www.wto.org/english/res_e/reser_e/annual_report_e.htm (access date: 10.04.2025)

² Risk management systems as a means of improving the efficiency of customs control [Electronic resource]: <https://www.jsdrm.ru/jour/article/view/66> (access date: 10.04.2025)

³ World Bank's Doing Business Rating. [Electronic resource] <https://archive.doingbusiness.org/ru/rankings> (access date: 10.04.2025)

EAEU seems methodologically incorrect due to significant differences in the structure of trade turnover, the level of digital maturity, and organizational and legal features of the customs system.

The first key aspect of adaptation is the transformation of data models. International experience shows that effective AI systems require standardized data sets for customs operations over a long period of time. For the EAEU, this implies: unification of data formats between national customs services; development of common classifiers of risk attributes; creation of data verification mechanisms. Of particular importance is the solution of the problem of "digital inequality" between the members of the Union, which requires a step-by-step approach to integration.

The second essential point of adaptation concerns the regulatory framework. The analysis of the European Regulation on Artificial Intelligence shows the need to develop its own concept of the legal status of AI solutions in the customs sphere of the EAEU. It should include: determining responsibility for decisions made with the help of AI, mechanisms for appealing such decisions, etc.

The third aspect is related to organizational changes. The experience of implementing AI in advanced customs administrations shows the importance of transforming organizational and managerial processes in parallel with technological changes. For the EAEU, this means: revising job descriptions to take into account new competencies, creating cross-functional teams at the intersection of IT and customs, and developing personnel retraining programs.

Also, unlike Western countries, China and Singapore, where high-tech exports predominate, in the member states of the Union, a significant share is occupied by raw materials and intermediate consumption products. Therefore, it is necessary to adapt machine algorithms to the features of classification and evaluation of such product groups.

A promising direction is the creation of a Eurasian platform for customs artificial intelligence, which would unite national components through common standards and protocols. At the same time, the platform architecture should provide for a modular principle that allows participating countries to connect to various services as they are ready.

The implementation of the proposed approach requires the development of a digital transformation map for the customs services of the EAEU. A key success factor can be the establishment of a permanent working group on the implementation and harmonization of AI systems within the existing structures of the EEC. This will ensure consistency of actions and allow you to accumulate best practices.